

1.1 PURPOSE

The goal of the Monitoring Program is to develop information to support effective watershed stormwater quality management programs. The purpose of these management programs is to reduce pollutants in stormwater discharges to the maximum extent practicable. The major objectives of the Monitoring Program outlined in the Municipal Permit are to:

- track water quality status, pollutant trends and pollutant loads, and identify pollutants of concern;
- monitor and assess pollutant loads from specific land uses and watershed areas;
- identify, monitor, and assess significant water quality problems related to stormwater discharges within the watershed;
- identify sources of pollutants in the stormwater runoff;
- identify and eliminate illicit discharges;
- evaluate the effectiveness of management programs, including pollutant reductions achieved by implementation of Best Management Practices (BMPs); and
- assess the impacts of stormwater runoff on receiving waters.

The Monitoring Program, developed to address these objectives, has several elements: Mass Emission runoff monitoring; Land Use runoff monitoring; and Critical Source runoff monitoring. Each element conducted in 1998-99 is described in Section 1.3, including the Permit objectives it addressed. The three-year study of impacts to Santa Monica Bay receiving waters was completed in 1997-98, and its Executive Summary is included in Appendix A. In addition to the receiving waters impacts study, the Department funded an additional study to assess the impacts during the unexpected El Niño year. The Executive Summary of this additional study is included in Appendix F. The Department of Public Works also funded a study to assess the impacts due to aerial deposition of pollutants. A summary of the first year of that study is included in Appendix G.

1.2 REPORT ORGANIZATION

The station selection process and the stations used in the Monitoring Program are described in Section 2.1. Maps and tabular descriptions of the tributary areas of each monitored watershed are displayed as Figures 2-1 through 2-14. The field and laboratory methods used in the program are presented in Section 3. The hydrologic and water quality results of the 1998-99 storm season monitoring are described in Section 4 along with the cumulative results for 1994-99, and the conclusions and recommendations based on the 1998-99 results are presented in Section 5.

Appendix A contains the Executive Summary of the Southern California Coastal Waters Research Project's (SCCWRP) Santa Monica Bay Receiving Waters Impact Study. Runoff hydrographs from all the monitoring stations and rainfall contour maps are presented in Appendix B. The complete water quality data for the 1998-99 season are provided in Appendix C and Appendix D contains SCCWRP's results for the 1998-99 River Toxicity Study. Appendix E contains tables of available data from the Los Angeles Regional Water Quality Control Board of the Industrial Stormwater Sampling Program. Appendix F contains the Executive Summary

of SCCWRP's El Niño study. Appendix G is a first quarter status report of SCCWRP's Aerial Deposition Study. Appendix H is a table of monitoring costs incurred, and Appendix I contains a list of people to contact for more information.

Appendices E through I, though not specifically required by the Municipal Stormwater permit, are included here in the interest of information sharing.

Los Angeles County was the primary author of this report having performed the bulk of the data and statistical analyses and writing much of the report. URS Greiner Woodward Clyde's role was primarily to compile and edit text and assist with conclusions and recommendations. The Southern California Coastal Waters Research Project performed the river toxicity tests and authored the Receiving Waters Study Executive Summary, the El Niño Study Executive Summary, and the Aerial Deposition Study First Quarter Report.

1.3 BACKGROUND

The 1994-95 storm season was the first for which stormwater monitoring was required under the 1990 Los Angeles County NPDES Municipal Stormwater Permit No. CA0061654. During the 1994-95 and 1995-96 seasons, automated and manual sampling was conducted to characterize stormwater quality and quantity in accordance with the 1990 Municipal Permit. The 1994-95 monitoring data is summarized in *Report of Stormwater Monitoring, Winter of 1994-95* (LACDPW, 1996).

The 1996-97 season was the first storm season in which stormwater monitoring was conducted under the new 1996 Municipal Permit (No. CAS614001). For the 1996-97 season the scope of the Monitoring Program was expanded to incorporate further data collection and new pilot studies. The one-year pilot studies, consisting of "Wide Channel" and "Low Flow" analyses, were completed and reported in the *Los Angeles County 1996-97 Stormwater Monitoring Report, July 15, 1997* (LACDPW and Woodward-Clyde, 1997).

The monitoring program, including the Mass Emission, Land Use, and Critical Source elements continued in the 1997-98 and 1998-99 storm seasons. The 1998-99 storm season also included funding from the Department of Public Works to the Southern California Coastal Waters Research Project to study the impacts to receiving waters of aerial deposition of pollutants.

At the request of the Regional Water Quality Control Board, this report includes the latest results (Appendix E) of the industrial stormwater permit sampling within the county. Due to the limitations of the data set, only summaries of maximum and minimum results can be provided. Also at the request of the RWQCB, detection limits for diazinon and chlorpyrifos were lowered to 50 ng/l.

1.3.1 Mass Emission Monitoring Program

Five mass emission monitoring stations were utilized for the Monitoring Program during the 1998-99 storm season. However, the station shelter on the Los Angeles River at Wardlow Road was under reconstruction during the entire season due to the raising of the levee walls by the Army Corps of Engineers (ACOE), and the automated sampling equipment was removed. Water quality samples from the Los Angeles River were collected manually at Wardlow Road and were not composited. Results from these manually collected samples were not included in event mean concentration (EMC) calculations. Stream flow data for the Los Angeles River at Wardlow

Road was synthesized from three upstream flow stations. Mass emission stations capture runoff from major Los Angeles County watersheds that generally have heterogeneous land use. These stations monitor flow and have automated samplers to collect composite samples during storm events. Grab samples are also taken at these stations in accordance with the Municipal Permit. Six storms were sampled at the Los Angeles River/Wardlow Site. A minimum of 12 storms were sampled at the remaining mass emission sites. The objectives of the mass emissions stations are to update estimated pollutant loads to the ocean and to identify long term trends in pollutant concentrations, if possible. River toxicity tests were also conducted for San Gabriel River and Los Angeles River dry and wet weather runoff for the second and final year.

This year's report presents, for the first time, in Section 4.2.2.5 calculations and estimates of pollutant loadings to the receiving waters from the 1994-95 storm season through the 1998-99 season. For those rivers where mass emissions were monitored, loads were calculated from observed flow volumes and observed pollutant concentrations. For those drainage areas that were not monitored, a newly developed GIS model was employed to estimate loads.

1.3.2 Land Use Program

Eight land use stations were monitored during the 1998-99 storm season. The land use monitoring program is a result of a site selection study entitled *Evaluation of Land Use Monitoring Stations* (Woodward-Clyde and Psomas and Associates, 1996). The study identified the most significant land use categories within the permit area regarding stormwater quality. The drainage area tributary to each land use monitoring station is comprised predominantly of a single land use and is relatively homogeneous. The eight land use categories that were monitored represent over 86% of all the land use within the permit area. These stations monitor flow and have automated samplers to collect flow weighted composite stormwater samples during storm events. The major objectives of this monitoring effort are to evaluate the effects of certain land uses on water quality, to identify the relative importance of specific land uses as pollution sources, and to provide data that can be used to project watershed loads from watersheds that do not have mass emission stations.

The 16 storms of the 1998-99 season yielded 77 land use station-events.

1.3.3 Critical Source/BMP Program

The Critical Source/BMP Monitoring Study was designed to assess the effectiveness of BMP implementation at critical sources of stormwater pollution. A list of critical sources were identified and ranked by their potential significance to stormwater quality (Woodward-Clyde, 1997) and are listed below:

- wholesale trade (including scrap yards and auto dismantlers);
- automotive repair/parking;
- fabricated metal products (including electroplating);
- motor freight (including trucking); and
- chemical manufacturing facilities.

For each critical source industry, there will be a multi-year study monitoring the stormwater runoff from six sites. During the first year of each study, runoff will be sampled and analyzed from five storms. During subsequent years, BMPs will be implemented at three of the six sites (test sites). BMP effectiveness will be estimated from monitoring data gathered at the pooled test sites and pooled control sites during ten additional storms. A complete study plan is included in *Critical Source Selection and Monitoring Report* (Woodward-Clyde, 1997). Sites at six automotive repair shops, six auto dismantlers, and six fabricated metal shops were monitored during the 1998-99 storm season.

The required minimum of 5 storms were sampled at the fabricated metals sites. Due to the prevalence of small, low intensity storms during the 1998-99 season, the remaining sites only produced sufficient runoff from 6 to 8 storms.

To characterize the quality of stormwater runoff in Los Angeles County, a combination of single land use sites and large area mass emissions sites have been selected for monitoring. fabricated metal products industry.